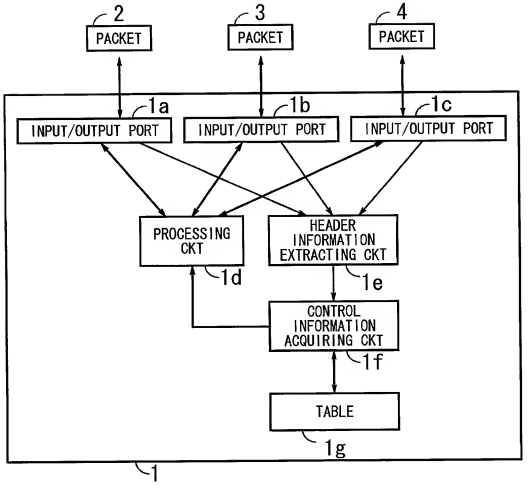

2
PACKET
3
PACKET
4
PACKET
1a
INPUT/OUTPUT PORT
1b
INPUT/OUTPUT PORT
1c
INPUT/OUTPUT PORT
PROCESSING CKT
1d
HEADER INFORMATION EXTRACTING CKT
1e
CONTROL INFORMATION ACQUIRING CKT
1f
TABLE
1g
1

FIG. 1

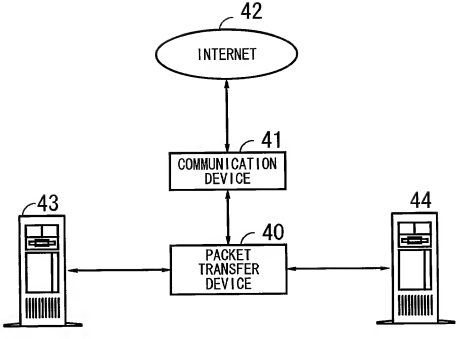

42
INTERNET
41
COMMUNICATION DEVICE
43
44
40
PACKET TRANSFER DEVICE

FIG. 2

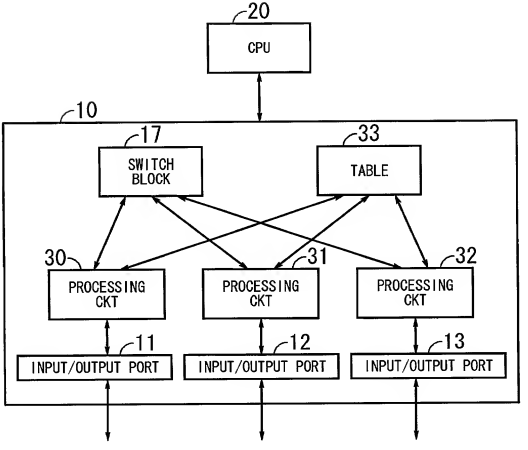

20
CPU
10
17
SWITCH BLOCK
33
TABLE
30
PROCESSING CKT
31
PROCESSING CKT
32
PROCESSING CKT
11
INPUT/OUTPUT PORT
12
INPUT/OUTPUT PORT
13
INPUT/OUTPUT PORT

FIG. 3

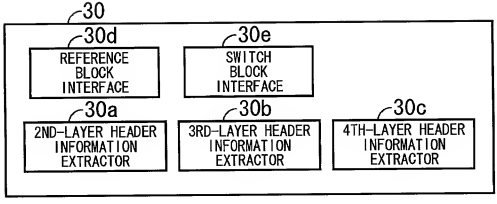

30
30d
REFERENCE BLOCK INTERFACE
30e
SWITCH BLOCK INTERFACE
30a
2ND-LAYER HEADER INFORMATION EXTRACTOR
30b
3RD-LAYER HEADER INFORMATION EXTRACTOR
30c
4TH-LAYER HEADER INFORMATION EXTRACTOR

FIG. 4(A)

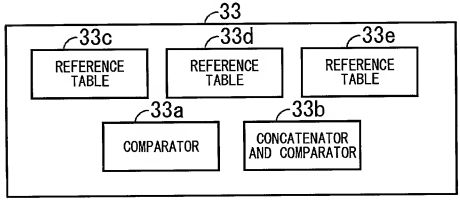

33
33c
REFERENCE TABLE
33d
REFERENCE TABLE
33e
REFERENCE TABLE
33a
COMPARATOR
33b
CONCATENATOR AND COMPARATOR

FIG. 4(B)

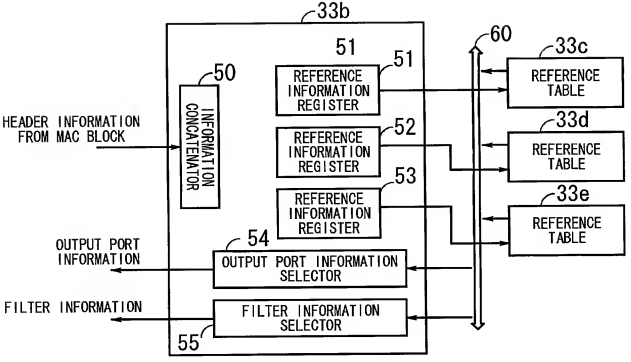

33b
60
51
33c
50
51
REFERENCE INFORMATION REGISTER
REFERENCE TABLE
HEADER INFORMATION FROM MAC BLOCK
INFORMATION CONCATENATOR
33d
52
REFERENCE INFORMATION REGISTER
REFERENCE TABLE
53
33e
REFERENCE INFORMATION REGISTER
REFERENCE TABLE
OUTPUT PORT INFORMATION
54
OUTPUT PORT INFORMATION SELECTOR
FILTER INFORMATION
FILTER INFORMATION SELECTOR
55

FIG. 5

REFERENCE FIELD				DATA FIELD	
SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER	INPUT/OUTPUT PORT	FILTERING
SA#1	DA#1	SP#1	DP#1	P#1	NO
SA#2	DA#2	SP#2	DP#2	P#2	NO
SA#3	DA#3	SP#3	DP#3	—	YES

FIG. 6

REFERENCE FIELD					DATA FIELD	
RECEPTION INPUT/OUTPUT PORT	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER	INPUT/OUTPUT PORT	FILTERING
PORT 11	gaany	ga#1	tcpany	80	CPU	NO
PORT 11	gaany	ga#1	tcpany	100	—	YES
. . .	. . .	. . .	. . .	. . .	. . .	. . .

FIG. 7

	DESTINATION MAC ADDRESS	SOURCE MAC ADDRESS	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER
PACKET #1	ma#1	max	gax	ga#1	x	80
PACKET #2	ma#1	max	gax	ga#1	x	100
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

FIG. 8

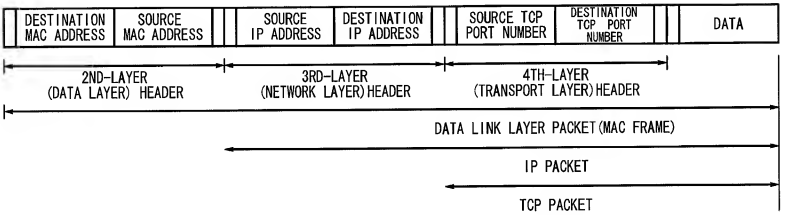

DESTINATION MAC ADDRESS
SOURCE MAC ADDRESS
SOURCE IP ADDRESS
DESTINATION IP ADDRESS
SOURCE TCP PORT NUMBER
DESTINATION TCP PORT NUMBER
DATA
2ND-LAYER (DATA LAYER) HEADER
3RD-LAYER (NETWORK LAYER) HEADER
4TH-LAYER (TRANSPORT LAYER) HEADER
DATA LINK LAYER PACKET (MAC FRAME)
IP PACKET
TCP PACKET

FIG. 9

REFERENCE FIELD				DATA FIELD	
SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER	INPUT/OUTPUT PORT	FILTERING
pa#1	pa#2	tcpany	110	PORT 13	NO
pa#1	pa#2	tcpany	100	—	YES
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

FIG. 10

	DESTINATION MAC ADDRESS	SOURCE MAC ADDRESS	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER
PACKET #1	mpa#2	mpa#1	pa#1	pa#2	x	110
PACKET #2	mpa#2	mpa#1	pa#1	pa#2	x	100
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

FIG. 11

REFERENCE FIELD		DATA FIELD	
SOURCE IP ADDRESS	DESTINATION IP ADDRESS	INPUT/OUTPUT PORT	FILTERING
pa#4	pa#1	PORT 12, 13	NO
pa#4	pa#2	PORT 13	YES
.	.	.	.
.	.	.	.
.	.	.	.

FIG. 12

REFERENCE FIELD				DATA FIELD	
SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER	INPUT/OUTPUT PORT	FILTERING
pa#4	pa#1	x	110	PORT 13	NO
pa#4	pa#2	x	100	PORT 13	NO
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

FIG. 13

	DESTINATION MAC ADDRESS	SOURCE MAC ADDRESS	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER
PACKET #1	ma#1	ma#2	pa#4	pa#1	x	110
PACKET #2	ma#1	ma#2	pa#4	pa#2	x	100
. . .	. . .	. . .	. . .	. . .	. . .	. . .

FIG. 14

REFERENCE FIELD	DATA FILED
IP ADDRESS #1	PORT 11
IP ADDRESS #2	PORT 12
IP ADDRESS #3	PORT 13

FIG. 15(A)

REFERENCE FIELD	DATA FIELD
TCP PORT #1	PORT 11
TCP PORT #2	PORT 12
TCP PORT #3	PORT 13

FIG. 15(B)

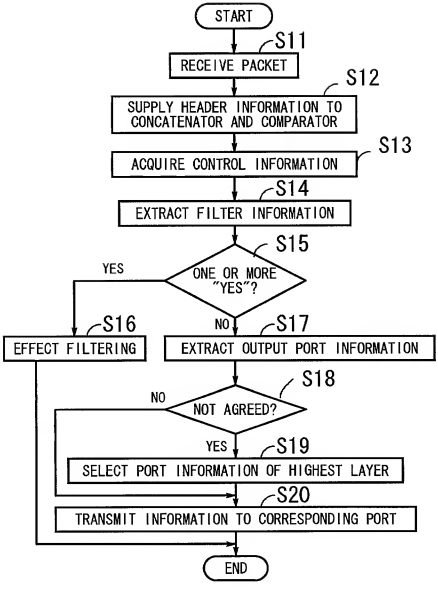

START
S11
RECEIVE PACKET
S12
SUPPLY HEADER INFORMATION TO CONCATENATOR AND COMPARATOR
S13
ACQUIRE CONTROL INFORMATION
S14
EXTRACT FILTER INFORMATION
S15
ONE OR MORE "YES"?
YES
NO
S16
EFFECT FILTERING
S17
EXTRACT OUTPUT PORT INFORMATION
S18
NOT AGREED?
NO
YES
S19
SELECT PORT INFORMATION OF HIGHEST LAYER
S20
TRANSMIT INFORMATION TO CORRESPONDING PORT
END

FIG. 16

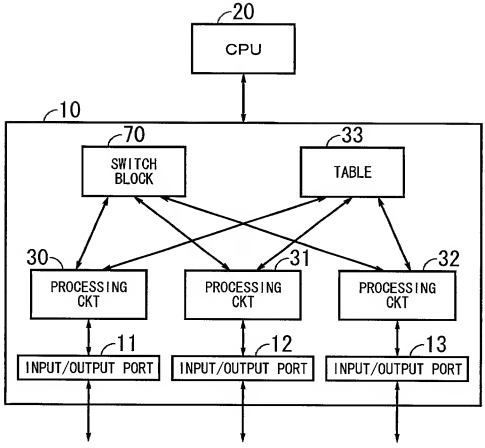

20
CPU
10
70
SWITCH BLOCK
33
TABLE
30
PROCESSING CKT
31
PROCESSING CKT
32
PROCESSING CKT
11
INPUT/OUTPUT PORT
12
INPUT/OUTPUT PORT
13
INPUT/OUTPUT PORT

FIG. 17

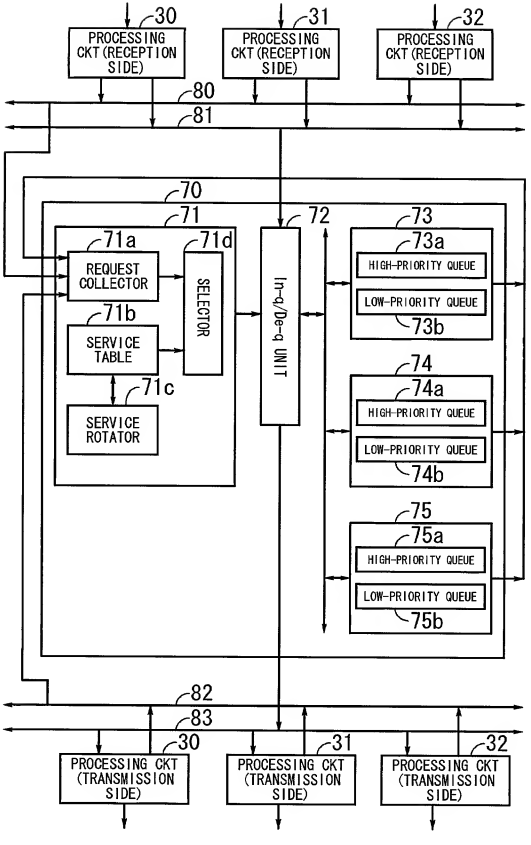

30
PROCESSING CKT (RECEPTION SIDE)
31
PROCESSING CKT (RECEPTION SIDE)
32
PROCESSING CKT (RECEPTION SIDE)
80
81
70
71
71a
REQUEST COLLECTOR
71b
SERVICE TABLE
71c
SERVICE ROTATOR
71d
SELECTOR
72
In-q/De-q UNIT
73
73a
HIGH-PRIORITY QUEUE
LOW-PRIORITY QUEUE
73b
74
74a
HIGH-PRIORITY QUEUE
LOW-PRIORITY QUEUE
74b
75
75a
HIGH-PRIORITY QUEUE
LOW-PRIORITY QUEUE
75b
82
83
30
PROCESSING CKT (TRANSMISSION SIDE)
31
PROCESSING CKT (TRANSMISSION SIDE)
32
PROCESSING CKT (TRANSMISSION SIDE)

FIG. 18

REFERENCE FIELD				DATA FIELD	
SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER	INPUT/OUTPUT PORT	PRIORITY
SA#1	DA#1	SP#1	DP#1	P#1	PRIORITY #1
SA#2	DA#2	SP#2	DP#2	P#2	PRIORITY #2
SA#3	DA#3	SP#3	DP#3	—	—

FIG. 19

REFERENCE FIELD				DATA FIELD	
SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER	INPUT/OUTPUT PORT	PRIORITY
any	pa#2	6000	6300	PORT 12	PRIORITY HIGH
any	pa#2	any	100	PORT 12	PRIORITY LOW
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

FIG. 20

	DESTINATION MAC ADDRESS	SOURCE MAC ADDRESS	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINATION TCP PORT NUMBER
PACKET #1	ma#2	ma#1	pa#1	pa#2	6000	6300
PACKET #2	ma#2	ma#3	pa#3	pa#2	x	100
. . .	. . .	. . .	. . .	. . .	. . .	. . .

FIG. 21

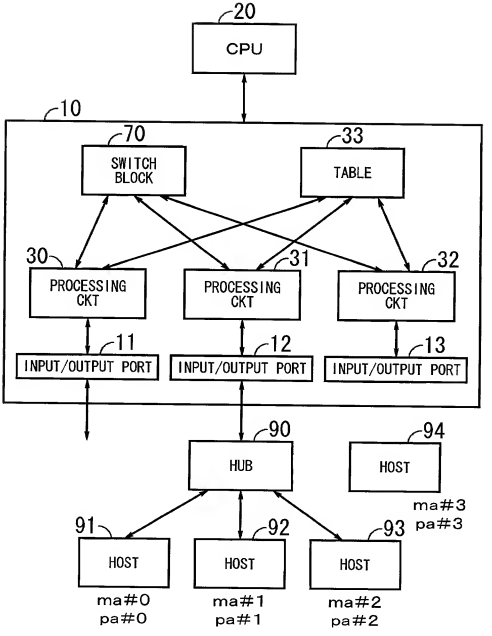

20
CPU
10
70
SWITCH BLOCK
33
TABLE
30
PROCESSING CKT
31
PROCESSING CKT
32
PROCESSING CKT
11
INPUT/OUTPUT PORT
12
INPUT/OUTPUT PORT
13
INPUT/OUTPUT PORT
90
HUB
94
HOST
ma#3
pa#3
91
HOST
92
HOST
93
HOST
ma#0
pa#0
ma#1
pa#1
ma#2
pa#2

FIG. 22

No.	CONTROL BITS	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE TCP PORT NUMBER	DESTINAITON TCP PORT NUMBER	TOS	PRIORITY: PORT
1	10001	pa#0	pa#3	—	—	000	LOW:PORT 12
2	10001	pa#1	pa#3	—	—	100	HIGH:PORT 12
3	10001	pa#2	pa#3	—	—	010	MEDIUM:PORT 12
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

FIG. 23

	DESTINATION MAC ADDRESS	SOURCE MAC ADDRESS	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	TOS VALUE
PACKET #1	ma#3	ma#0	pa#0	pa#3	000
PACKET #2	ma#3	ma#1	pa#1	pa#3	100
PACKET #3	ma#3	ma#2	pa#2	pa#3	010
⋮	⋮	⋮	⋮	⋮	⋮

FIG. 24

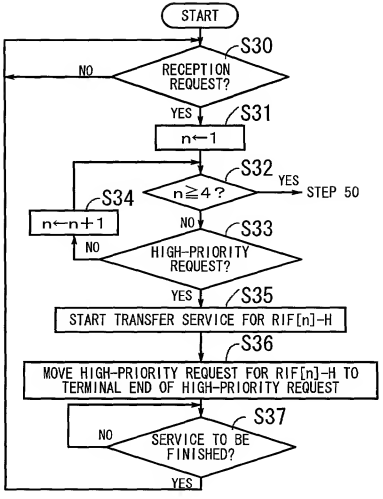

START
S30
RECEPTION REQUEST?
NO
YES
S31
n←1
S32
n≧4?
YES
STEP 50
S34
n←n+1
NO
S33
HIGH-PRIORITY REQUEST?
NO
YES
S35
START TRANSFER SERVICE FOR RIF[n]-H
S36
MOVE HIGH-PRIORITY REQUEST FOR RIF[n]-H TO TERMINAL END OF HIGH-PRIORITY REQUEST
S37
NO
SERVICE TO BE FINISHED?
YES

FIG. 25

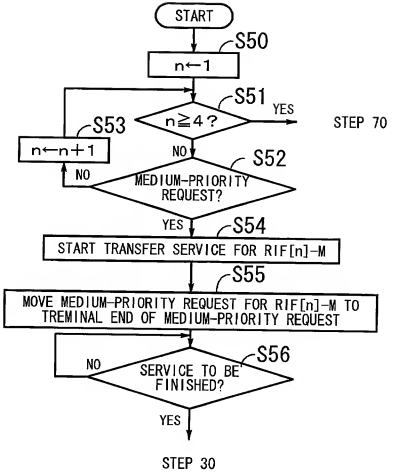

START
S50
n←1
S51
n≧4?
YES
STEP 70
S53
n←n+1
NO
S52
NO
MEDIUM-PRIORITY REQUEST?
YES
S54
START TRANSFER SERVICE FOR RIF[n]-M
S55
MOVE MEDIUM-PRIORITY REQUEST FOR RIF[n]-M TO TREMINAL END OF MEDIUM-PRIORITY REQUEST
S56
NO
SERVICE TO BE FINISHED?
YES
STEP 30

FIG. 26

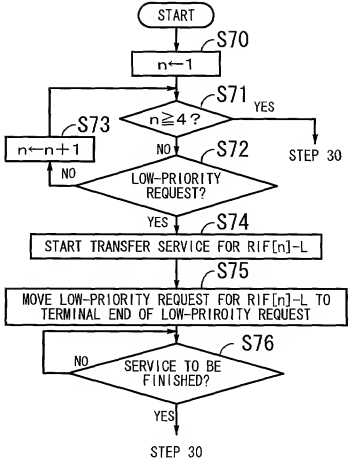
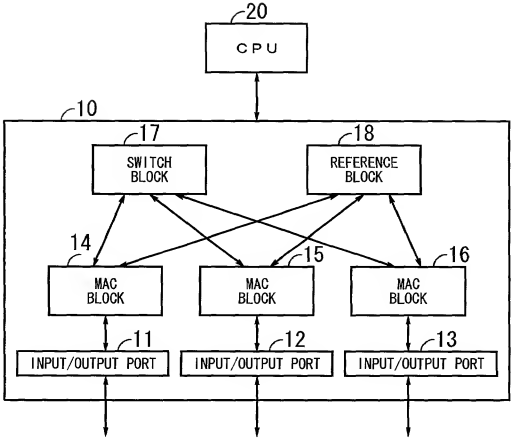
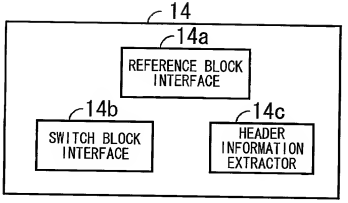

START
S70
n←1
S71
n≧4?
YES
STEP 30
S73
n←n+1
NO
S72
NO
LOW-PRIORITY REQUEST?
YES
S74
START TRANSFER SERVICE FOR RIF[n]-L
S75
MOVE LOW-PRIORITY REQUEST FOR RIF[n]-L TO TERMINAL END OF LOW-PRIROITY REQUEST
S76
NO
SERVICE TO BE FINISHED?
YES
STEP 30

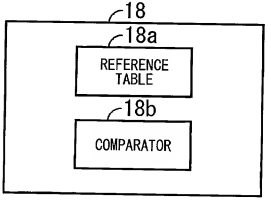
FIG. 27



PRIOR ART
FIG. 28



PRIOR ART
FIG. 29(A)



PRIOR ART
FIG. 29(B)

REFERENCE FIELD	DATA FIELD
MAC ADDRESS #1	PORT NUMBER #1
MAC ADDRESS #2	PORT NUMBER #2
MAC ADDRESS #3	PORT NUMBER #3

PRIOR ART
FIG. 30